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EXAMINER	
TRINH, THANH TRUC	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
04/06/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No.	Applicant(s)	
	10/723,554	GAUDIANA ET AL.	
	Examiner	Art Unit	
	THANH-TRUC TRINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-18 and 23-82* is/are pending in the application.

4a) Of the above claim(s) *75-80* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-18,23-74,81 and 82* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/5/09, 3/20/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1. Claims 1-12, 14-18 and 23-82 are pending in the application. Of the above claims 75-80 are withdrawn from consideration.

2. All previous rejection is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-12, 14-18, 23-42, 53-62, 64-69 and 81-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scher et al. (US Patent 6878871) in view of Sariciftci et al. (US Patent 5331183). The subject matter relied upon below is supported by Scher

et al's provisional application 60/421353 filed on 10/25/2002, and thus has a 102(e) date with respect to the instant claims.

Regarding claims 1 and 81, as seen in Figure 7, Scher et al. discloses a photovoltaic cell comprising a first electrode (704); a mesh electrode (706); and a photoactive layer (702) between the electrodes, wherein the photoactive layer (702 which is similar to photoactive layer 102 as seen in Figures 1 and 4A) comprises an electron acceptor such as nanocrystals (104) and an electron donor material (106) such as conductive polymer P3HT. (See col. 14 lines 48-67; col. 32 lines 27-57; and col. 17 line 25-38).

Scher et al. does not specifically teach using fullerene as an electron accepting material.

Sariciftci et al. teaches a photoactive layer of a solar cell (or photovoltaic cell – See abstract) having fullerene as the electron acceptor and polymer as an electron donor. (See col. 3 line 7 through col. 6 line 17)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the photovoltaic cell of Scher et al. by using fullerene as taught by Sariciftci et al. in place of the nanocrystals for the electron acceptor material, because Sariciftci et al. teaches using fullerene would have advantages in cost reduction, simplifying the fabrication procedures and enabling a continuous manufacturing process and fabricating of large area solar cells (See col. 1 line 15 through col. 4 line 6). With respect to claim 81, it is the Examiner's position that Scher et al's wire mesh or screen mesh reads on the instant "printed mesh" because the "printed

mesh" appears to be a product by process limitation that does not further define the structure of the mesh electrode and thus is not given weight in the apparatus claim. The determination of patentability of a product is based on the product itself, not on its method of production. If the product in the product-by-process is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). MPEP 2113.

Regarding claims 2-4, 6-7 and 25, Scher et al. describes both electrodes (first and second electrodes, or anode and cathode) can be wire arrays, interspersed with complementary wires. (See col. 31 lines 20-36). Therefore, it is the Examiner's position that Scher et al. teaches both anode and cathode are mesh electrodes comprising wires and electrically conductive material.

Regarding claims 5 and 8, Scher et al. teaches the electrodes can be made of metal. (See col. 30 line 63 to col. 31 line 4; col. 32 lines 45-49).

Regarding claims 9-10, Scher et al. teaches the wire electrodes can be coated with blocking layers (See col. 31 lines 20-36). Scher et al. also teaches a material for electron blocking layer is polymer P3HT (See col. 22 lines 30-43). Therefore it is the Examiner's position that Scher et al. teaches the wire electrodes comprises coating including electrically conductive material such as polymer.

Regarding claims 11-12, Scher et al. teaches the electrodes are overlapping arrays of wires or interspersed with complementary wires (See col. 31 lines 20-36). Therefore it is the Examiner's position that Scher et al. teaches woven mesh electrodes.

It is also the Examiner's position that Scher et al's wire mesh electrode reads on the instant "expanded mesh" because the "expanded" does not impart a distinguishable physical limitation. For example, the metal material, the thickness, the opening size of the mesh, etc., of the instant expanded mesh electrode can be the same as in Scher et al. regardless of whether or not Scher et al's wire mesh electrode has been subjected to a product-by-process expanding step. In other words, any wire metallic mesh electrode is essentially the same as the instant expanded mesh electrode in the absence of a recitation of a distinguishing feature.

Regarding claim 14, Sariciftci et al. teaches using substituted fullerenes (See claim 1)

Regarding claims 15-16, both Scher et al. teaches using electron donor polymer comprising poly(3-hexylthiophene). (col. 17 lines 26-38 of Scher et al.).

Regarding claims 17-18, Scher et al. teaches including a hole blocking layer between the photoactive layer and an electrode (or the first electrode - See col. 27 lines 41-49). The hole blocking layer comprises a metal oxide such as TiO_2 (See col. 22 lines 1-43).

Regarding claims 23-24, as seen in Figure 4A, Scher et al. teaches including a hole carrier layer (or electron blocking layer 410) between the photoactive layer (102) and an electrode (110), wherein the hole carrier layer comprises polythiophenes (See col. 22 lines 1-43). Scher et al. also teaches either electrodes can be mesh electrode. (See col. 31 lines 20-36). Therefore it is the Examiner's position that Scher et al. teaches that the hole carrier layer is between the first electrode and the photoactive

layer since the position of the hole blocking and hole carrier depends on the position of the electron acceptor and electron donor in the photoactive layer.

Regarding claims 26-27, 32-33, 39, 53-54, 59-60 and 66, as seen in Figure 4A, Scher et al. discloses a photovoltaic cell comprising a first electrode (108); a second electrode (110); and a photoactive layer (102) between the electrodes, wherein the active layer (102 as seen in Figure 1) comprises an electron acceptor such as nanocrystals (104) and an electron donor material (106) such as conductive polymer P3HT; a hole blocking layer (420) between the first electrode (108) and the photoactive layer (102); a hole carrier (or electron blocking layer 410) between second electrode (110) and the photoactive layer (102). (See col. 14 lines 48-67; col. 22 line 1 to col. 23 line 7; and col. 17 line 25-38). Scher et al. also teaches that both electrodes can be formed by overlapping arrays of wires (See col. 31 lines 20-36), or wire mesh. Therefore it is the Examiner's position that the first and second electrodes can be wire mesh electrodes, the first mesh electrode (second electrode 110) is in contact with the hole carrier, and the second mesh electrode (first electrode 108) is in contact with the hole blocking layer.

Scher et al. does not specifically teach using fullerene as an electron accepting material.

Sariciftci et al. teaches a photoactive layer of a solar cell (or photovoltaic cell – See abstract) having fullerene as the electron acceptor and polymer as an electron donor. (See col. 3 line 7 through col. 6 line 17)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the photovoltaic cell of Scher et al. by using fullerene as taught by Sariciftci et al. in place of the nanocrystals for the electron acceptor material, because Sariciftci et al. teaches using fullerene would have advantages in cost reduction, simplifying the fabrication procedures and enabling a continuous manufacturing process and fabricating of large area solar cells (See col. 1 line 15 through col. 4 line 6).

Regarding claims 28, 34, 55 and 61, Scher et al. teaches the electrodes can be made of metal. (See col. 30 line 63-col. 31 line 4; col. 32 lines 45-49.

Regarding claims 29-31 and 56-58, Scher et al. teaches the hole carrier (or electron blocking layer) comprising polythiophenes, and hole blocking layer comprising TiO_2 (or metal oxide). (See col. 22 lines 1-43).

Regarding claims 35-36 and 62, Scher et al. teaches the wire electrodes can be coated with blocking layers, electron blocking (or hole carrier) and hole blocking layer. (See col. 31 lines 20-36). Scher et al. also teaches a material for electron blocking (or hole carrier) layer is polymer P3HT (See col. 22 lines 30-43). Therefore it is the Examiner's position that Scher et al. teaches the wire mesh electrodes comprise coating including electrically conductive material, wherein the wire mesh electrode in contact with the hole carrier is coated with hole carrier material such as polymer.

Regarding claims 37-38 and 64-65, Scher et al. teaches the electrodes are overlapping arrays of wires or interspersed with complementary wires (See col. 31 lines 20-36). Therefore it is the Examiner's position that Scher et al. teaches woven mesh

electrodes. It is also the Examiner's position that Scher et al's wire mesh electrode reads on the instant "expanded mesh" because the "expanded" does not impart a distinguishable physical limitation. For example, the metal material, the thickness, the opening size of the mesh, etc., of the instant expanded mesh electrode can be the same as in Scher et al. regardless of whether or not Scher et al's wire mesh electrode has been subjected to a product-by-process expanding step. In other words, any wire metallic mesh electrode is essentially the same as the instant expanded mesh electrode in the absence of a recitation of a distinguishing feature.

Regarding claims 40 and 67, as seen in Figure 7, Scher et al. teaches a substrate (710) supporting the mesh electrode (706).

Regarding claims 41 and 68, Scher et al. describe depositing PEDOT-PSS onto the substrate before depositing nanocyrstal blend solution with one ingredient is a hole carrier material. (See Examples 1 and 2). Therefore, it is the position of the Examiner's that PEDOT:PSS is an adhesive material and being deposited between the substrate and the hole carrier.

Regarding claims 42 and 69, as seen in Figure 7, Scher et al. describes the photoactive layer (702) is in contact with the substrate (710) through openings (708). In addition, the photoactive layer comprises hole carrier (See col. 17 lines 39-50). Scher et al. also teaches the wire mesh electrode can be coated with hole carrier material. Therefore it is the Examiner's position that the hole carrier is in contact with the substrate supporting the mesh electrode on the hole carrier side through openings of the mesh electrode.

Regarding claim 82, Scher et al. teaches a thickness of a metal electrode is approximately 200 nm (See col. 43 lines 5-10). Therefore it would have been obvious to one skilled in the art that the mesh electrode of Scher et al. can have a thickness of 200 nm, or in the range of a maximum thickness of at most about 10 microns.

4. Claims 43-52 and 70-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scher et al. in view of Sariciftci et al. and further in view of Chapin et al. (US Patent 2780765).

Scher et al. and Sariciftci et al. teach a photovoltaic cell as applied to claims 1-12, 14-18, 23-42, 53-62, 64-69 and 81-82 above, wherein Scher et al. describes the output of the cell connected to a load (See Figure 1 of Scher et al.).

Neither Scher et al or Sariciftci et al. specifically teaches electrically connecting the cells in series or in parallel.

Chapin et al. teach connecting the photovoltaic cells in series and parallel. (See col. 4 lines 45-74).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the photovoltaic cells of Scher et al. and Sariciftci et al. in either series or parallel as taught by Chapin et al, because Chapin et al. teaches connecting photovoltaic cells in series or in parallel would give a large voltage or a large current, respectively, according to the desired output. (See col. 4 lines 48-50 of Chapin et al.).

5. Claims 63 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scher et al. in view of Sariciftci et al. and further in view of Griffin (US Patent 3442007).

Scher et al. and Sariciftci et al. teach a photovoltaic cell as applied to claims 1-12, 14-18, 23-42, 53-62, 64-69 and 81-82 above

Scher et al. in view of Sariciftci et al. does not teach coating wire mesh electrode in contact with the hole blocking with metals, alloys, polymers and combinations thereof.

Griffin et al. teach coating a wire mesh with electrically conductive material such as gold, copper or nickel. (See col. 2 lines 63-72).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the photovoltaic cell of Scher et al. in view of Sariciftci et al. by coating the wire mesh with metal as taught by Griffin et al. before optionally coating with hole blocking material, because Griffin et al. teach coating the wire with metals such as gold, copper or nickel would provide an effective adhesion and good power efficiency. (See col. 2 lines 62 to col. 3 line 4 of Griffin et al.)

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1-12 and 14- 18, 23-74 and 81-82 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-39 of copending Application No. 11/033217 in view of Scher et al. (US Patent 6878871). The subject matters of the claims of copending Application No. 11/033217 are substantially the same as that of the instant claims, except for the manner in which the electrodes are in the shape of a mesh, a hole blocking layer, a hole carrier layer. It would have been obvious to one having ordinary skill in the art to modify the cell of claims 1-39 of copending Application No. 11/033217 by utilizing the materials as taught Scher et al., because it would provide a desired overall device property. (See col. 4 lines 56-58).

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

Applicant's arguments filed 1/5/2009 have been fully considered but they are not persuasive.

Applicant argues that the combination of Scher et al. in view of Sariciftci et al. is improper because Scher et al. teaches two inorganic materials exhibit a type II band offset energy profile and the conductive polymer component is optional and is not part of the photoactive material, while Saricifti's photovoltaic material is formed of two different organic material and does not involve an inorganic material. Applicant also argues that light is absorbed by the nanocrystals and fullerene has weak visible light absorption; therefore it cannot be used to replace the nanocrystals of Scher et al. However, Applicant's arguments are not deemed to be persuasive. First of all, the two inorganic materials (core and shell) is one of the embodiments taught by Scher et al, which is not relied upon in the rejection. In Figure 1, Scher et al. teaches a photoactive layer 102 comprising electron (e^-) conducting naocrystals (or electron acceptor) 104 and hole conducting (θ) polymer matrix 106 (see Figure 1, e.g. the arrows of charge conduction in Figure 1; col. 14 line 21-67; col. 15 line 65 through col. 16 line 46, col. 17 lines 25-67). Secondly, the nanocrystals of Scher et al. are used for electron acceptor, and the fullerene of Saricifti is also used for electron acceptor. Therefore it would have been obvious to one skilled in the art to replace the nanocrystals of Scher et al. with the fullerene of Saricifti because fullerene is a suitable material for electron acceptor, particularly in view of the fact that Applicant describes nanocrystals and fullerene are suitable for electron acceptor material (see Applicant's disclosure, lines 16-20 on page 3, lines 13-20 on page 9); and because Saricifti teaches that using fullerene would have advantages in cost reduction, simplifying the fabrication procedures and enabling a

continuous manufacturing process and fabricating of large area solar cells (See col. 1 line 15 through col. 4 line 6).

Applicant argues that Scher et al. does not teach a printed mesh electrode having a maximum thickness of at most about 10 microns, because Scher et al. appears to teach forming a mesh foil first and dispose the mesh foil onto the photovoltaic material and it is well known that a mesh foil typically has a thickness significantly larger than about 10 microns. First of all, Applicant provides no evidence that a mesh foil used as an electrode in photovoltaic cell is significantly larger than about 10 microns thick. Secondly, Scher et al. teaches the electrodes in a photovoltaic cell can be metal (e.g. aluminum) and have architecture of a screen mesh to gain more conductivity and efficiency (See col. 32 lines 27-57). Scher et al. also teaches a metal electrode (e.g. aluminum) having a thickness of 200 nm (see col. 43 lines 5-10). Therefore it would have been obvious that the metal mesh electrode of Scher et al. can have a thickness of 200nm, because such thickness is well within the scope of Scher et al. In addition, "printed mesh" appears to be a product by process limitation that does not further define the structure of the mesh electrode and thus is not given weight in the apparatus claim. The determination of patentability of a product is based on the product itself, not on its method of production such as printing.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH-TRUC TRINH whose telephone number is (571)272-6594. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

TT
3/27/2008